



EUROPEAN PATENT APPLICATION

Application number : **93500031.5**

Int. Cl.⁵ : **B22C 15/22, B22C 13/12, B22C 15/24**

Date of filing : **12.03.93**

Priority : **16.03.92 ES 9200572**

Date of publication of application :
22.09.93 Bulletin 93/38

Designated Contracting States :
AT CH DE FR GB IT LI SE

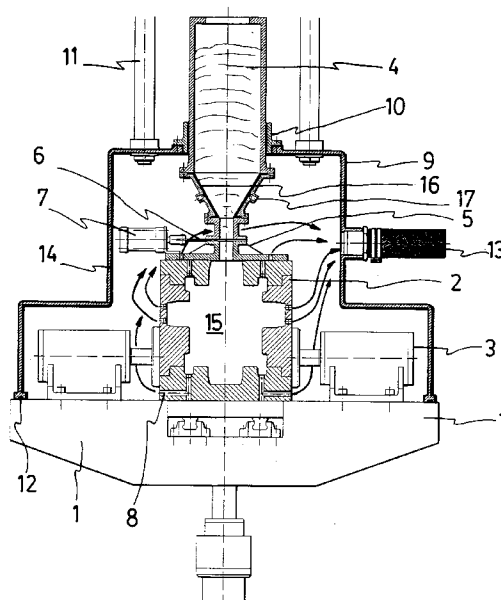
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Coreshooter for self-setting process with vacuum system.

Such comprises surrounding the corebox (2), to establish a workable chamber (14) between the blowing cartridge (4) and the table (1), and a tight seal on such elements, with a bell (9) fitted with a connection (13) to a vacuum pump, so that prior to the valve (6) opening, which causes the blowing cartridge (4) to discharge into (15) the corebox (2), inside the latter, through the classic holes (8) expelling the air and likewise through the surrounding chamber (14), a depression or vacuum is provided which considerably enhances the discharge of the blowing cartridge (4), allowing the latter to be effected even in highly complex or sizeable cores, without having to use special blowing nozzles or heads, viz. allowing the use of a universal blowing nozzle (5) for all cases, without there being a risk of the sand/binder mixture not reaching remote areas of the corebox (2).



SPECIFICATION

OBJECT OF THE INVENTION

The present invention relates to a number of improvements in core-shooting machines to work with a self-setting process, which improvements are designed to allow a single universal blowing plate, even when highly complex and/or sizeable cores are to be obtained, and to prevent the sand-additives self-setting mixture from hardening and the block from leaving the cartridge, which would impair shooting efficiency and hence driving of the sand into the core-box.

BACKGROUND OF THE INVENTION

It is well-known that in a conventional core-shooting machine the corebox is located on the so-called working table, which table is hydraulically provided with upward and downward movement. The blowing cartridge is in turn provided on the corebox, loaded with the measure of sand and binding additives required to fill the box and obtain the desired core. The blowing head (not shown) is provided on the blowing cartridge to cause the release of the air-blast which reaches into the cartridge and drives the sand from the same into the corebox, once the said three parts, namely corebox-cartridge-blowing head are tightly coupled when the air is released.

Depending on whether the process is in a hot or a cold box, heat is provided to the boxes or else they are gassed in order to cause the binding material to be polymerised and hence the core produced to be hardened, thereupon to be removed from the box.

In the so-called self-setting process, the sand is mixed by additives that are able to cause self-setting within a short space of time (one second) and the casting process begins almost in the actual cartridge, whence if the release of the air-blast is delayed only slightly the outlet of the cartridge may be blocked and the discharge of the sand impaired or at least not be fully effected.

In the above conventional shooters, between the cartridge carrying the measure of sand and the core-box, the so-called blowing plate is provided, fitted with a number of nozzles for the sand to reach the box through selected points, in accordance with the geometric and dimensional characteristics and the complexity of the core to be made, viz. the inner volume of the core which must be uniformly filled with sand, reaching all its corners. Each blowing plate will therefore be studied for a given corebox so that a change of box will entail a change of blowing plate, which poses no serious problem in mass productions or large series, for the box changes take place over long time spreads.

However, when in small productions, short ser-

ies, the boxes are changed frequently and therefore so is the blowing plate, which means that a considerable amount of production time is wasted due to the handling operations required.

Furthermore, when complex or sizeable cores are to be obtained in a process known as self-setting, the conventional core-shooting machines can prove inefficient, either because they are not able to fully and evenly fill the corebox, or because part of the sand remains in the cartridge because the setting process shall have begun therein, and the air-blast released shall have been insufficient to drive the mixture entirely.

DESCRIPTION OF THE INVENTION

The improvements subject of the invention have been designed to fully solve the above problems, in every respect.

More specifically and in order to achieve the above, one of the improvements subject hereof comprises providing the core-shooting machines with a bell that is slidably and tightly mounted on the blowing cartridge, coaxial therewith and in turn also capable of being coupled tightly to the working table in the machine, making up a sealed precinct in which the corebox is housed, the said bell being connected to a vacuum source which is applied thereto before the air-blast is released through the blowing head, which air causes the cartridge to discharge. Thus, the vacuum established in the bell is also transmitted into the corebox through the classic air expelling holes with which the latter is fitted.

In accordance with the above, when the valve isolating the cartridge from the corebox is opened, the discharge of the sand or self-setting mixture is made not only by the drive of the air-blast reaching into the cartridge from the blowing head, but also by the actual depression or vacuum existing in the corebox, which guarantees a swift and even spreading of the self-setting mixture throughout the inner volume of the box, reaching and filling the most remote accesses.

Finally, and in accordance with another of the improvements subject hereof, the lower cup-shaped part of the blowing cartridge has been provided to have an inner membrane, which is made to vibrate by an air connection, in order thereby to enhance the discharge of the cartridge into the corebox, preventing sand in an advanced stage of setting from accumulating at the outlet mouth of the cartridge and, in short, removing the self-setting mixture from such choked area.

In accordance with this structure and as aforesaid, it is possible for the discharge from the blowing cartridge to be efficient, since the shooting pressure and the inner pressure in the corebox are joined to each other, thereby to ensure a perfect definition and

homogenisation of the core obtained. Furthermore, the same blowing plate is used for all coreboxes, with the time savings this entails.

DESCRIPTION OF THE DRAWINGS

In order to provide a fuller description and contribute to the complete understanding of the characteristics of this invention, a single sheet of drawings is attached to the specification which, while purely illustrative and not fully comprehensive, partially shows a core-shooting machine, made in accordance with the improvements subject of the present invention, a lateral view showing the part of the machine pertaining to the working table, corebox and blowing cartridge, the latter two in cross-section.

PREFERRED EMBODIMENT OF THE INVENTION

In light of this only figure, it can be observed that the improvements subject hereof are applicable to a core-shooting machine for conventional casting, in which a vertically displaceable table (1) is established, in charge of receiving the corebox (2) which is duly fixed in the working position, for instance by means of clamps (3), and operatively facing a blowing cartridge (4) that may be coupled to the top of the corebox (2), with a blowing plate (5) fitted in between, a valve being established between the cartridge (4) and the blowing plate (5), for instance a guillotine valve (6) driven by the relevant cylinder (7). Once the blowing head is coupled to the cartridge, and the latter to the corebox, everything will be ready for the self-setting mixture in the cartridge to be discharged into the corebox, driven by the air-blast released by the blowing head.

Now then, from this basic and conventional structure, the improvements subject hereof comprise providing the machine table (1) with a removably-mounted bell (9), preferably provided with a guide bushing (10) which allows it to slide on the actual blowing cartridge (4), with a tight coupling in order to allow the elevation thereof and hence the possibility of handling the same on the area where the corebox (2) is disposed, whenever the stays (11) associated thereto are actuated by any suitable means. The said bell (9) may in turn be tightly coupled to the said machine working table (1), as shown by the figure, with the assistance of the relevant sealing joint (12).

This bell (9) has a connection (13) to a suitable vacuum bridge or pump, so that right before the release caused by the blowing head (not shown) and with the valve (6) shut-off and the bell (9) supported by the table (1), defining a tight chamber (14), the said chamber (14) is provided with a vacuum which shall through the holes (8) of the corebox (2) also communicate with the inside (15) of the latter, and therefore when the valve (6) is opened and at the

same time the air-blast is released by the blowing head, the cartridge (4) discharges remarkably fast and advantageously, since two different and complementary forces are joined and combined, namely the air-blast reaching into the cartridge from above and the suction caused by the vacuum in the corebox (2), thereby allowing fast, total and homogeneous filling of the corebox and hence the perfect forming of the core that is to be obtained.

To complement the above structure the cup-shaped lower sector of the blowing cartridge (4) is fitted with a membrane (16) covering the inside of the same and defining a perimetric chamber with the actual cartridge wall, which chamber communicates with the outside through one or several connections (17), through which air is sent into the chamber alternatively, to cause the membrane (16) to vibrate and thereby prevent the sand from blocking the choked cartridge area.

We feel that the description need be extended no further for an expert in the art to grasp the full scope of the invention and the advantages it offers.

The materials, shape, size and layout of the elements may be altered provided that this entails no modification of the essential features of the invention.

The terms used to describe the invention herein should be taken to have a broad rather than a restrictive meaning.

Claims

1.- Improvements in coreshooters for self-setting process with vacuum system, of the kind having a table (1) on which the corebox (2) is disposed to receive a sand discharge from a blowing cartridge (4) arranged on the same and through a blowing plate (5), essentially characterised in comprising the arrangement of a bell (9) which plays tightly and preferably on the blowing cartridge (4), and coaxially therewith, and capable of coupling tightly to the machine table (1), to define a tight chamber (14) in which the corebox (2) is housed, singular in that this bell (9) carries a connection (13) to a pump or other suitable vacuum source, communicating the said vacuum to the chamber (14) in the bell (9) and the inside (15) of the corebox (2) through the necessary gauged holes (8) for the air to leave from such corebox during the blowing stage as such, a valve (6) being fitted which isolates the corebox (2) from the blowing cartridge (4) until the air-blast is released, at which point the said valve (6) is opened and the cartridge discharge is enhanced by the thrust of the air-blast and the inner depression in the corebox.

2.- Improvements in coreshooters for self-setting process with vacuum system, as in claim 1, characterised in that the blowing cartridge (4) is fitted at its lower cup-shaped sector close to its mouth with a

membrane (16) which establishes with the said cup-shaped wall an annular chamber, sealed from the actual inside of the blowing cartridge (4) and with external connections (17) through which it is alternatively provided with an air-blast which causes the membrane (16) to vibrate.

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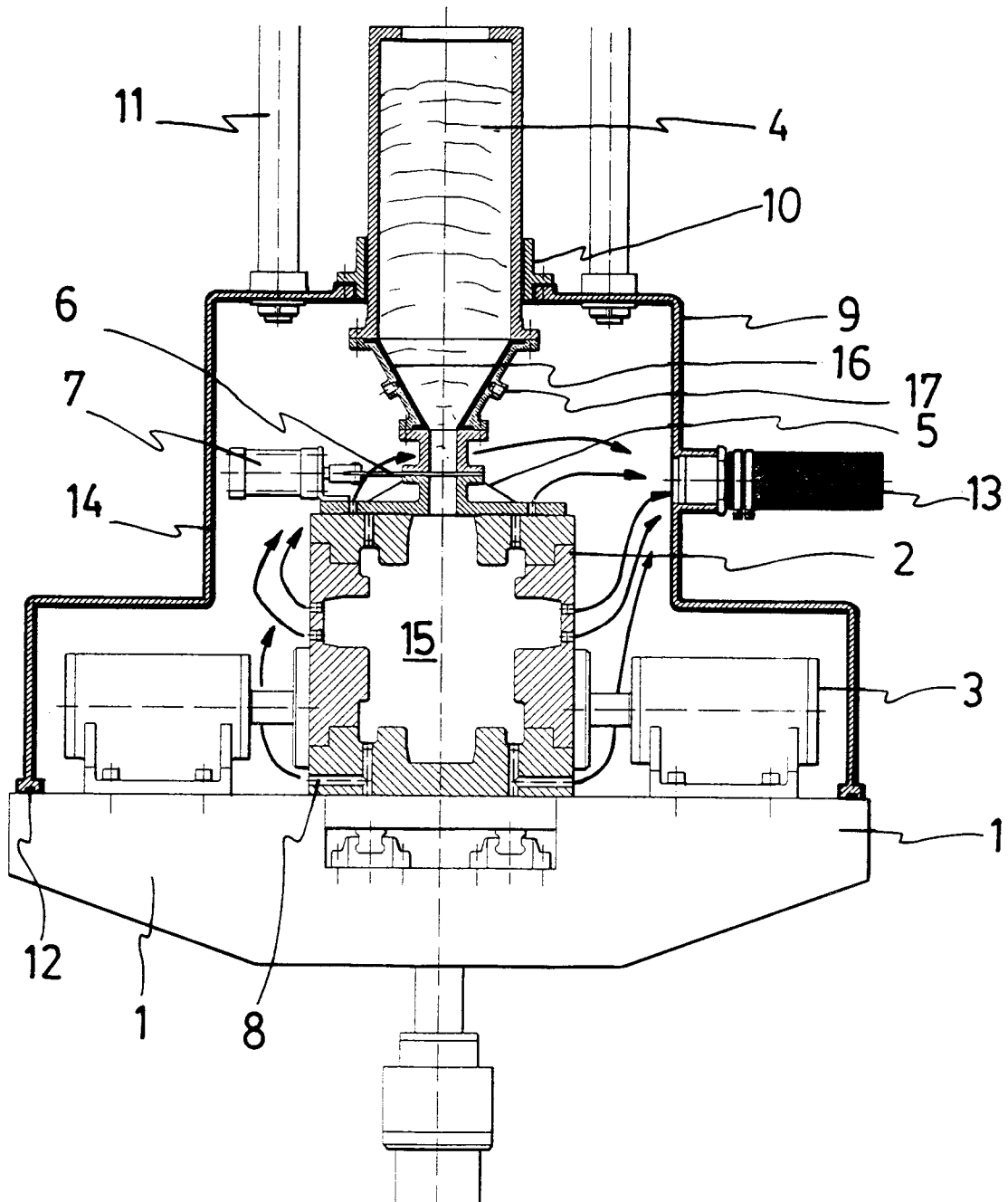
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European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 93 50 0031

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	PATENT ABSTRACTS OF JAPAN vol. 6, no. 184 (M-157)21 September 1982 & JP-A-57 091 841 (SINTOKOGYO LTD) 8 June 1982 * abstract *	1	B22C15/22 B22C13/12 B22C15/24
X	& GB-A-2 088 261 (SINTOKOGYO LTD) 26 August 1981	1	
Y	* abstract * * figure 1 *	2	

X	DE-A-3 008 235 (EUGEN BÜHLER) 10 September 1981	1	
Y	* claims * * figures *	2	

Y	DE-C-653 978 (CARL BILLAND) 18 November 1937 * claim 1 * * figure 3 *	2	

A	DE-A-2 923 271 (ARENCO-BMD MASCHINENFABRIK GMBH) 11 December 1980 * page 5, line 2 - page 6, line 10 * * figures *	2	

The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 14 JUNE 1993	Examiner RIBA VILANOVA M.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

EPO FORM 1503 03.92 (P0401)